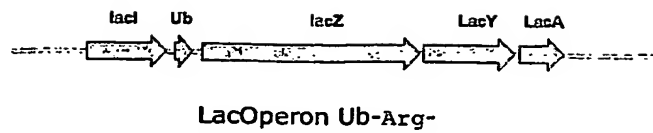


FIG. 1

(a)



(b)

M Q I F V K T L T G K T I T L E V E S S D T I D

CGGATAACAA TTTCACACAG GAAACAGCTA TGCAGATTTT CGTCAAGACT TTGACCGGTA AAACCATAAAC ATTGGAAAGTT GAATCTTCCG ATACCATCGA
GCCTATTGTT AAAGTGTGTC CTTTGTGAT ACGTCTAAAA GCAGTTCTGA AACTGGCCAT TTGGGTATTG TAACCTTCAA CTTAGAAGGC TATGGTAGCT
D N V K S K I Q D K E G I P P D Q Q R L I F A G K Q L E D G R T L S
CAACGTTAAG TCGAAAATTC AAGACAAGGA AGGTATCCCT CCAGATCAAC AAAGATTGAT CTTTGCCGGT AAGCAGCTAG AAGACGGTAG AACGCTGTCT
GTTGCAATTC AGCTTTTAAAG TTCTGTTCT TCCATAGGGA GGTCTAGTTG TTCTAACTA GAAACGGCCA TTCGTCGATC TTCTGCCATC TTGCGACAGA
D V N I Q K E S T L H L V L R L R G B R H G S G A V L L P V S L V K
GATTACAACA TTCAGAAGGA GTCCACCTTA CATCTTGTGC TAAGGCTAAG AGGTGGTAGG CACGGATCCG GAGCTTGGCT GTTGCCCGTC TCACTGGTGA
CTAATGTTGT AAGTCTTCT CAGGTGGAAT GTAGAACAG ATTCCGATTC TCCACCATCC GTGCCTAGGC CTCGAACCGA CAACGGGCAG AGTGACCACT
K R K T T L A P N T Q T A S P R A L A D S L M Q L A R Q V S R L N R
AAAGAAAAAC CACCTGGCG CCCAATACGC AAACCGCCTC TCCCGCGCGG TTGGCCGATT CATTAAATGCA GCTGGCACGA CAGGTTTCCC GA
TTTCTTTTGT GTGGGACCGC GGGTTATGCG TTGGCGGAG AGGGCGCGC AACCGGCTAA GTAATTACGT CGACCGTGCT GTCCAAAGGG CTAAATAGC
R L A A H P P F A S V R N S E E A R T D R P S Q Q L R S L N G E V R
CTTCTAAGCAAT CCGGCTT TGGCGAGTGGGCTATAGCGTAAGAGAGCCCTGGGGAAGCGGCGGATCCATCAATTGCGGCTGAAATGAACTATC
GGAAAGTCTGCTAGCGGCAACCGGTGAGTGGCTATCTCTGCGGCTGGGTAGCGGGAGGGTCTTAACCGCTACCGAGTATCTGCTTACGGC

FIG. 2

k12-el

	Met	Gln	Ile	Phe	Val	Lys	Thr	Leu	Thr	Gly	Lys	Thr	Ile	Thr	Leu	Glu	Val	Glu	Ser	Ser	Asp	Thr	Ile	Asp	Asn	Val	Lys	Ser	Lys		
5001	ACAGGAAACA	GCTATGCCAG	TTTTGTCGAA	GACTTTGACC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT											
	Ile <td>Gln<td>Asp<td>Lys<td>Glu<td>Gly<td>Ile<td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gln <td>Asp<td>Lys<td>Glu<td>Gly<td>Ile<td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Asp <td>Lys<td>Glu<td>Gly<td>Ile<td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Lys <td>Glu<td>Gly<td>Ile<td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Gly<td>Ile<td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gly <td>Ile<td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ile <td>Pro<td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Pro <td>Pro<td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Pro <td>Asp<td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Asp <td>Gln<td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gln <td>Glu<td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Leu<td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Ile<td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ile <td>Phe<td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Phe <td>Ala<td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ala <td>Gly<td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td>	Gly <td>Lys<td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td>	Lys <td>Glu<td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Leu<td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td></td>	Leu <td>Glu<td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td></td>	Glu <td>Asp<td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td></td>	Asp <td>Gly<td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td></td>	Gly <td>Asp<td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td></td>	Asp <td>Thr<td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td></td>	Thr <td>Asn<td>Ile<td>Gln<td>Lys</td></td></td></td>	Asn <td>Ile<td>Gln<td>Lys</td></td></td>	Ile <td>Gln<td>Lys</td></td>	Gln <td>Lys</td>	Lys		
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTTGC	CGGTAAGCAG	CTAGAAGACG	GTAGAAGCGT	GTCTGATTAC	AACATTTCAGA	TAACTTCTGT	TGCTTCCATA	GGGAGGTCTA	GTGTGTTCTA	ACTAGAAACG	GCCATTGCTC	GATCTTCTGC	CATCTTCCGA	CAGACTAATG	TTGTAAGTCT											
	Thr <td>Glu<td>Ser<td>Thr<td>Leu<td>Ile<td>Val<td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Ser<td>Thr<td>Leu<td>Ile<td>Val<td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ser <td>Thr<td>Leu<td>Ile<td>Val<td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Leu<td>Ile<td>Val<td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Ile<td>Val<td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ile <td>Val<td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Val <td>Lys<td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Lys <td>Leu<td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Arg<td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Arg <td>Gly<td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gly <td>Glu<td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Leu<td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Met<td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Met <td>Gly<td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gly <td>Ser<td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ser <td>Gly<td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gly <td>Ala<td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ala <td>Thr<td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Leu<td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Leu<td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Pro<td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td></td>	Pro <td>Val<td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td></td>	Val <td>Ser<td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td></td>	Ser <td>Leu<td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td></td>	Leu <td>Val<td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td></td>	Val <td>Thr<td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td></td>	Thr <td>Gln<td>Asn<td>Arg<td>Leu</td></td></td></td>	Gln <td>Asn<td>Arg<td>Leu</td></td></td>	Asn <td>Arg<td>Leu</td></td>	Arg <td>Leu</td>	Leu
5201	AGGAGTCCAC	CTTACATCTT	GTGCTAAGGC	TAAAGAGTGG	TTTGCACGGA	TCCGGAGCTT	GGCTGTTGCC	CGTCTCAGTG	GTGAAAAGAA	AAACACCTCT	TGCTCAGGTG	GAATGTAGAA	CACGATTCCG	ATTCTCCACC	AAACGTGCTT	AGGCTTCGAA	CCGACACCGG	GCAGAGTGAC	CACATTTTCT	TTTGTGGGGA											
	Thr <td>Ala<td>Ala<td>Met<td>Pro<td>Pro<td>Phe<td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ala <td>Ala<td>Met<td>Pro<td>Pro<td>Phe<td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ala <td>Met<td>Pro<td>Pro<td>Phe<td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Met <td>Pro<td>Pro<td>Phe<td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Pro <td>Pro<td>Phe<td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Pro <td>Phe<td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Phe <td>Ala<td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ala <td>Cys<td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Cys <td>Thr<td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Arg<td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Arg <td>Asn<td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Asn <td>Ser<td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ser <td>Glu<td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Ala<td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ala <td>Arg<td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Arg <td>Pro<td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td></td>	Pro <td>Ser<td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td></td>	Ser <td>Glu<td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Leu<td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td></td>	Leu <td>Arg<td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td></td>	Arg <td>Ser<td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td></td>	Ser <td>Leu<td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td></td>	Leu <td>Asn<td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td></td>	Asn <td>Cys<td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td></td>	Cys <td>Gln<td>Thr<td>Arg<td>Phe</td></td></td></td>	Gln <td>Thr<td>Arg<td>Phe</td></td></td>	Thr <td>Arg<td>Phe</td></td>	Arg <td>Phe</td>	Phe		
5301	ACAGGAAACA	GCTATGCCAG	TTTTGTCGAA	GACTTTGACC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT											
	Met <td>Gln<td>Ile<td>Phe<td>Val<td>Lys<td>Thr<td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gln <td>Ile<td>Phe<td>Val<td>Lys<td>Thr<td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ile <td>Phe<td>Val<td>Lys<td>Thr<td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Phe <td>Val<td>Lys<td>Thr<td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Val <td>Lys<td>Thr<td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Lys <td>Thr<td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Leu<td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Thr<td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Gly<td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Gly <td>Lys<td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Lys <td>Thr<td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Ile<td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Ile <td>Thr<td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Thr <td>Leu<td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Leu <td>Glu<td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Val<td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td></td>	Val <td>Glu<td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td></td>	Glu <td>Ser<td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td></td>	Ser <td>Ser<td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td></td>	Ser <td>Asp<td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td></td>	Asp <td>Thr<td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td></td>	Thr <td>Ile<td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td></td>	Ile <td>Asp<td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td></td>	Asp <td>Asn<td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td></td>	Asn <td>Val<td>Lys<td>Ser<td>Lys</td></td></td></td>	Val <td>Lys<td>Ser<td>Lys</td></td></td>	Lys <td>Ser<td>Lys</td></td>	Ser <td>Lys</td>	Lys		

k12-e2

	Met	Gln	Leu	Phe	Val	Lys	Thr	Leu	Thr	Gly	Lys	Thr	Leu	Glu	Val	Glu	Ser	Ser	Asp	Thr	Leu	Asp	Asn	Val	Lys	Ser	Lys	
5001	ACAGGAAACA	GCTATGCCAG	TTTTGTCGAA	GACTTTGACC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT								
-1	Leu	Gln	Asp	Lys	Gly	Thr	Pro	Thr	Gln	Asp	Lys	Leu	Phe	Ala	Lys	Gln	Leu	Glu	Asp	Gly	Thr	Leu	Ser	Asp	Thr	Ala	Glu	Lys
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTTGC	CGGTAAGCAG	CTAGAAGACG	GTAGAAGCGT	GTCTGATTAC	AACATTTCAGA	TAACTTCTGT	TGCTTCCATA	GGGAGGTCTA	GTGTGTTCTA	ACTAGAAACG	GCCATTGCTC	GATCTTCTGC	CATCTTCCGA	CAGACTAATG	TTGTAAGTCT								
-1	Thr	Gln	Ser	Thr	Leu	His	Leu	Val	Asp	Gly	Lys	Thr	Ala	Gly	Thr	Leu	Lys	Leu	Val	Ser	Leu	Val	Lys	Asp	Lys	Thr	Leu	Thr
5201	AGGAGTCCAC	CTTACATCTT	GTGCTAAGGC	TAAAGAGTGG	TTTGCACGGA	TCCGGAGCTT	GGCTGTTGCC	CGTCTCAGTG	GTGAAAAGAA	AAACACCTCT	TGCTCAGGTG	GAATGTAGAA	CACGATTCCG	ATTCTCCACC	AAACGTGCTT	AGGCTTCGAA	CCGACACCGG	GCAGAGTGAC	CACATTTTCT	TTTGTGGGGA								
-1	Phe	Ala	Phe	Asn	Thr	Gln	Thr	Ala	Ser	Pro	Thr	Gln	Leu	Asn	Arg	Leu	Ala	His	Thr	Pro	Phe	Ala	Ser	Glu	Gly	Asp	Thr	Leu
5301	GGCGCCCCAT	ACGCAAAACG	CTCTCTCTTA	CGATCTTGGC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT								
-1	CGCGGGTTTA	TGCGTTTGGC	GGAGAGCA	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT									

k12-e3a

	Met	Gln	Leu	Phe	Val	Lys	Thr	Leu	Thr	Gly	Lys	Thr	Leu	Leu	Glu	Val	Glu	Ser	Ser	Asp	Thr	Leu	Asp	Asn	Val	Lys	Ser	Lys	
5001	ACAGGAAACA	GCTATGCCAG	TTTTGTCGAA	GACTTTGACC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT									
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTTGC	CGGTAAGCAG	CTAGAAGACG	GTAGAAGCGT	GTCTGATTAC	AACATTTCAGA	TAACTTCTGT	TGCTTCCATA	GGGAGGTCTA	GTGTGTTCTA	ACTAGAAACG	GCCATTGCTC	GATCTTCTGC	CATCTTCCGA	CAGACTAATG	TTGTAAGTCT									
5201	AGGAGTCCAC	CTTACATCTT	GTGCTAAGGC	TAAAGAGTGG	TTTGCACGGA	TCCGGAGCTT	GGCTGTTGCC	CGTCTCAGTG	GTGAAAAGAA	AAACACCTCT	TGCTCAGGTG	GAATGTAGAA	CACGATTCCG	ATTCTCCACC	AAACGTGCTT	AGGCTTCGAA	CCGACACCGG	GCAGAGTGAC	CACATTTTCT	TTTGTGGGGA									
5301	ATTCTGAGAC	TCGCGCTTAA	GGTAAAGGCG	CTCCAGGAT	CTCCGCTT	CCATGACT	TCGCGAGCTG	GGTCTGAT	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG	GGCTGATG									

k12-n3

	Met	Lys	Leu	Pro	Ile	Tyr	Leu	Asp	Tyr	Ser	Ala	Ser	Thr	Met	Ile	Thr	Asp	Ser	Leu	Ala	Val	Val	Leu	Gln	Arg	Arg	Asp	Tyr	Glu	
5001	ACAGGAAACA	GCTATGCCAG	TTTTGTCGAA	GACTTTGACC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT										
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTTGC	CGGTAAGCAG	CTAGAAGACG	GTAGAAGCGT	GTCTGATTAC	AACATTTCAGA	TAACTTCTGT	TGCTTCCATA	GGGAGGTCTA	GTGTGTTCTA	ACTAGAAACG	GCCATTGCTC	GATCTTCTGC	CATCTTCCGA	CAGACTAATG	TTGTAAGTCT										
5201	AGGAGTCCAC	CTTACATCTT	GTGCTAAGGC	TAAAGAGTGG	TTTGCACGGA	TCCGGAGCTT	GGCTGTTGCC	CGTCTCAGTG	GTGAAAAGAA	AAACACCTCT	TGCTCAGGTG	GAATGTAGAA	CACGATTCCG	ATTCTCCACC	AAACGTGCTT	AGGCTTCGAA	CCGACACCGG	GCAGAGTGAC	CACATTTTCT	TTTGTGGGGA										
5301	ACAGGAAACA	GCTATGCCAG	TTTTGTCGAA	GACTTTGACC	GGTAAACCA	TAAACATTGGA	AGTTGAATCT	TCCGATACCA	TGCACACCGT	TAAGTCGAAA	TGTCCTTTGT	CGATACGCTT	AAAAGCAGTT	CTGAAACTGG	CCATTITGGT	ATTGTAACCT	TCAACTTAGA	AGGCTATGGT	AGCTGTGGCA	ATTACAGCTT										

K12-n5

	Met	Gln	Glu	Gly	Gln	Asn	Asp	Lys	Thr	Ser	Ser	Thr	Met	Leu	Thr	Asp	Ser	Leu	Ala	Val	Val	Leu	Gln	Asp	Thr	Glu
5001	ACAGGAAACA	GCTATGATGC	AGGAAGCGGA	AGGCGCGAAA	ACACGACGCA	CCATGATCTG	GAAATTCATG	GGCGTGCTTT	TACAACTGTC	TTACTGGGAA	TGCTCTTTGT	CGATACGCTT	TGCTGCGTGT	GGTACTAATG	CCGCAAGTAC	CCGCAAGAAA	ATTGTCGAC	AGTGAACCTG								
5101	AACTCGGCG	TTACCCGAT	TTATCGGCT	CGACGACATG	CGGCTTTGCG	AGCTGCTGCT	ATAGCGAAG	AGCGGCGAC	CGATCGGCGA	CGGTAAGAT	TGGGACCGG	TAATGCGCTT	TGCGGCGCTG	CTATGCGGGA	AGGCTATGCA											
	ATGGAACCGG	TAATGGGTTA	ATTACGGGA	AGGCTGTGAC	GGGGAAGGCG	GTGAGACCGA	TTATGCGCTT	TGCGGCGCTG	CTATGCGGGA	AGGCTATGCA																

FIG 3a

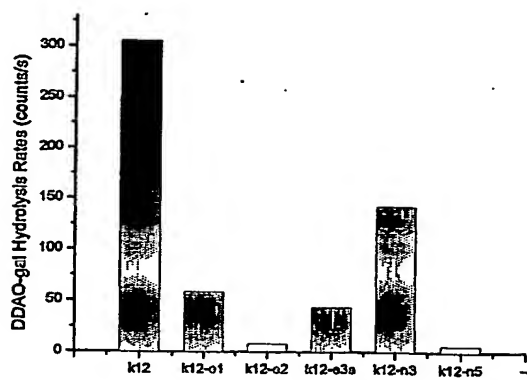


FIG 3b

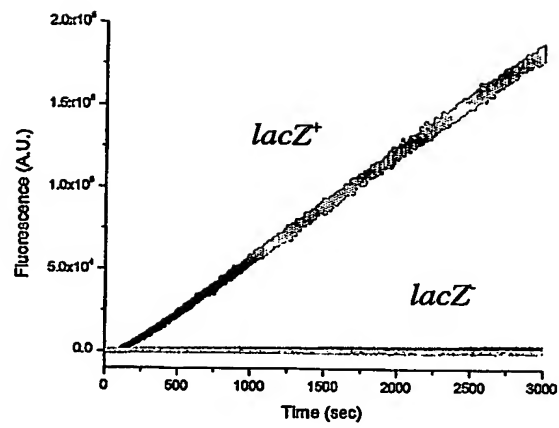


FIG. 4

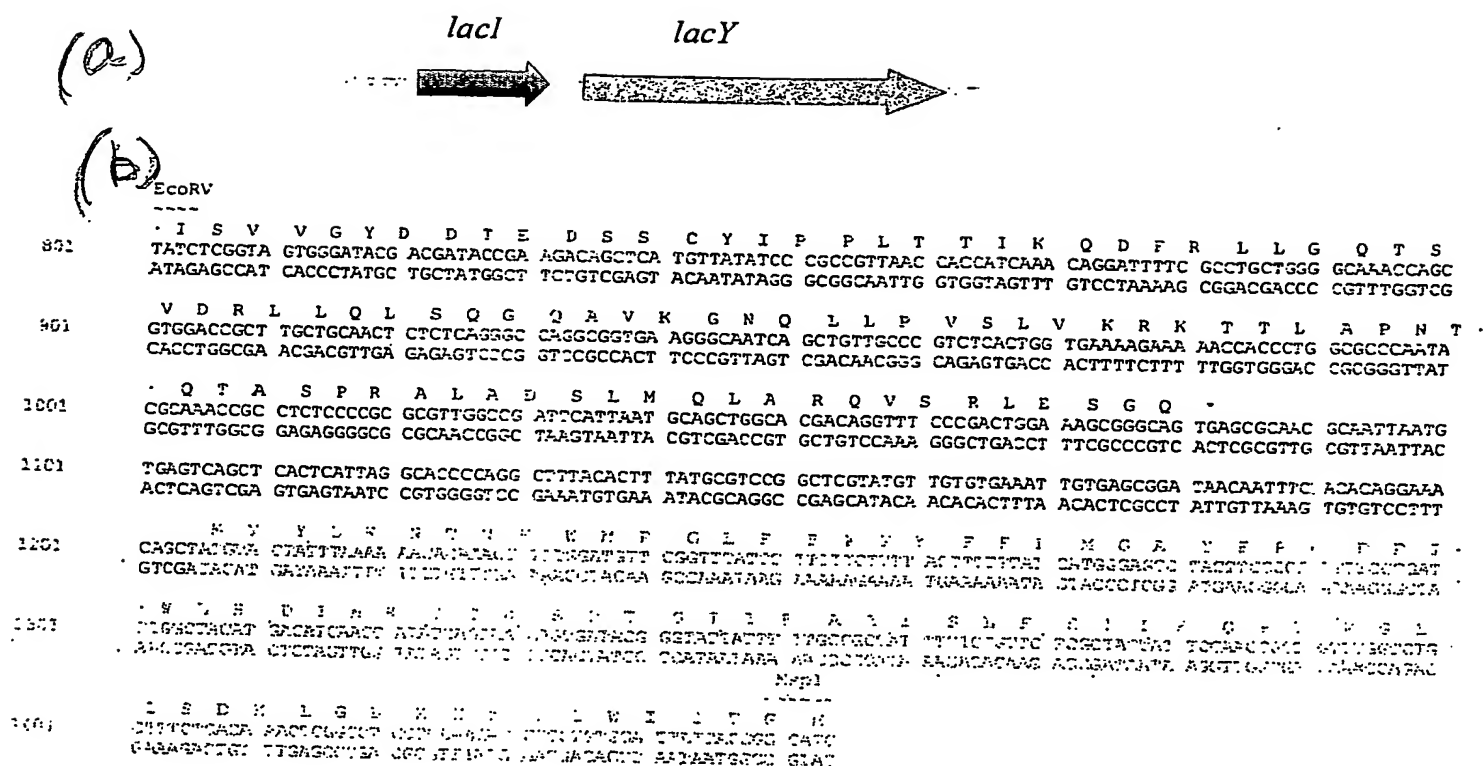


FIG. 5

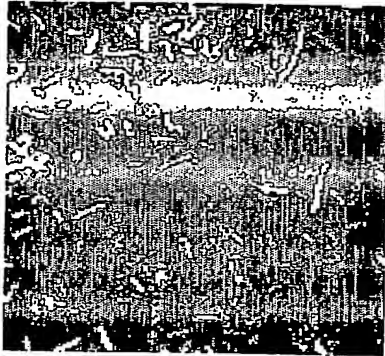


FIG. 6.

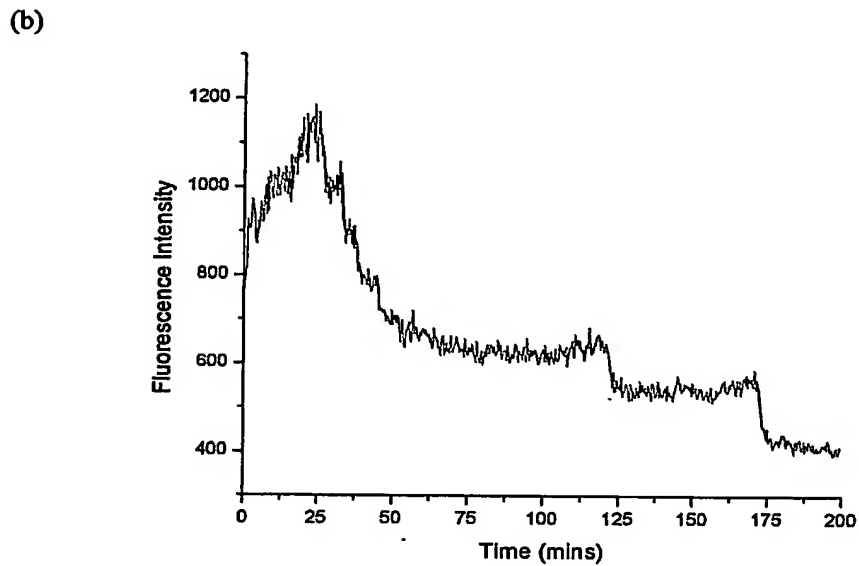
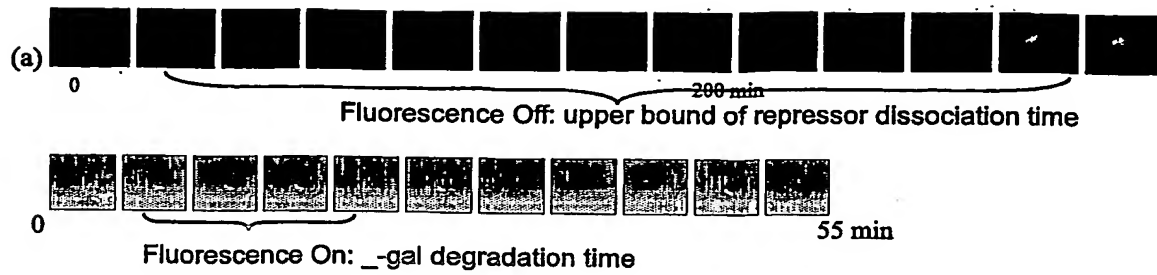
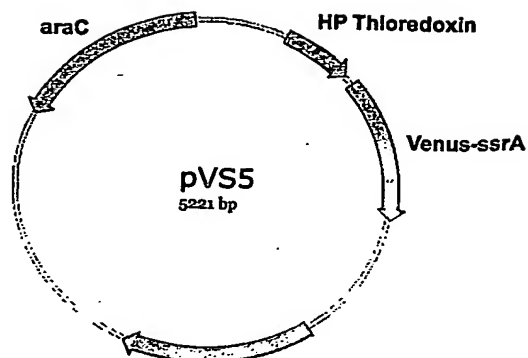


FIG. 7

(a)



(b)

ACAAGCTGGG AATTGATCCC TTCACGAGCA AGGGCGAGGA GCTGTTCCACC GGGGTGGTGC CCATCCTGGT CGAGCTGGAC GGGGACGTAA ACGGCCACAA
 TGTTCGACCC TTAAGTAGGG AAGTGGTCTG TCCCGCTCTT CGACAAGTGG CCCCACCACG GGTAGGACCA GCTCGACCTG CCGCTGCATT TGCCGGTGTG
 Lys Phe Ser Val Ser Gly Gln Gly Gln Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Leu Ser Cys Thr Thr Gly Lys Leu Pro Val Pro Tyr Pro Thr
 GTTCAGCGTG TCCGGCGAGG GCGAGGGCGA TGCCACCTAC GGCAAGCTGA CCCTGAAGCT GATCTGCACC ACCGGCAAGC TGCCCGTGCC CTGGCCCAAC
 CAAGTCGCAC AGGCCGCTCC CGCTCCCGCT ACGGTGGATG CCGTTCGACT GGGACTTCGA CTAGACGTGG TGGCCGTTCC ACGGGCACGG GACCGGGTGG
 Leu Val Thr Thr Leu Gly Tyr Gly Leu Gln Cys Phe Ala Arg Tyr Pro Asp His Met Lys Gln His Asp Phe Phe Lys Ser Ala Met Pro Gln Gly Tyr Val
 CTCGTGACCA CCTGGGCTA CGCCCTGCAG TCGTTCGCCC GCTACCCCGA CCACATGAAG CAGCACGACT TCTTCAAGTC CGCCATGCCC GAAGGCTACG
 GAGCACTGGT GGGACCCGAT GCGCGACGTC ACGAAGCGGG CGATGGGGCT GGTGTACTTC GTCGTGCTGA AGAAGTTCAG GCGGTACGGG CTTCGGATGC
 Val Gln Gln Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Gln Val Lys Phe Gln Gly Asp Thr Leu Val Asn Arg Ile Gln Leu Lys
 TCCAGGAGCG CACCATCTTC TTCAAGGAGC ACGGCAACTA CAAGACCCGC GCGAGGTGA AGTTCGAGGG CGACACCCTG GTGAACCGCA TCGAGCTGAA
 AGGTCTCTCG GTGGTAGAAG AAGTTCCTGC TGCCGTTGAT GTTCTGGGCG CGGCTCCACT TCAAGCTCCC GCTGTGGGAC CACTTGGCGT AGCTCGACTT
 Lys Gly Ile Asp Phe Lys Gln Asp Gly Asn Ile Leu Gly His Lys Leu Gln Tyr Asn Tyr Asn Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn
 GGGCATCGAC TTCAAGGAGG ACGGCAACTA CCTGGGGCAC AAGCTGGAGT ACAACTACAA CAGCCACAAC GTCTATATCA CCGCCGACAA GCAGAAGAAC
 CCGTAGCTG AAGTTCCTCC TGCCGTTGTA GGACCCCGTG TTCGACCTCA TGTGATGTT GTCCGTGTTG CAGATATAGT GCGGGCTGTT CGTCTTCTTG
 Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Gln Asp Gly Gly Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly Pro Val
 GGCATCAAGG CCAACTTCAA GATCCGCCAC AACATCGAGG ACGGCGGCGT GCAGCTCGCC GACCACTACC AGCAGAACAC CCCCATCGGC GACGGCCCGG
 CCGTAGTTC GGTGAAAGTT CTAGCGGCTG TTGTAGCTCC TGCCGCCCGA CCGGAGCGG CTGGTGTATG TCGTCTTGTG GGGGTAGCCG CTGCCGGGGC
 Val Leu Leu Pro Asp Asn His Tyr Leu Ser Tyr Gln Ser Ala Leu Ser Lys Asp Pro Asn Gln Lys Arg Asp His Met Val Leu Leu Gln Phe Val Thr Ala
 TGCTGCTGCC CGACAACCAC TACCTGAGCT ACCAGTCCGC CCTGAGCAAA GACCCCAACG AGAAGCGCGA TCACATGGTC CTGCTGGAGT TCGTGACCGC
 ACGACGCGG GCTGTTGGT ATGGAAGTCA TGGTCAGGCG GGAATCGTTT CTGGGGTTGC TCTTCGCGCT AGTGTACCAG GACGACCTCA AGCACTGCGC
 Ala Ala Gly Ile Thr Leu Gly Met Asp Gln Leu Tyr Lys Ala Ala Asn Asp Gln Asn Tyr Ala Leu Ala Ala ---
 CGCCGGGATC ACTCTGGCA TGGACGAGCT GTACAAGGCC GCCAACGACG AGAAGTACCG CTTAGCCGCC TAAGAAAAGG GCGAGCTCAA GCTTGAAGGT
 GCGGCCCTAG TGAGAGCCGT ACCTGCTCGA CATGTTCCGG CGGTTGCTGC TCTTGATGCG GAATCGGCGG ATTCTTTTCC CGCTCGAGTT CGAAGTTCCT

FIG. 8

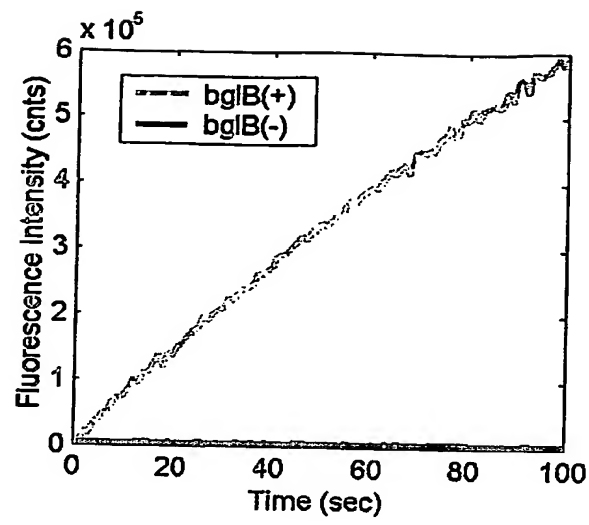


FIG. 9

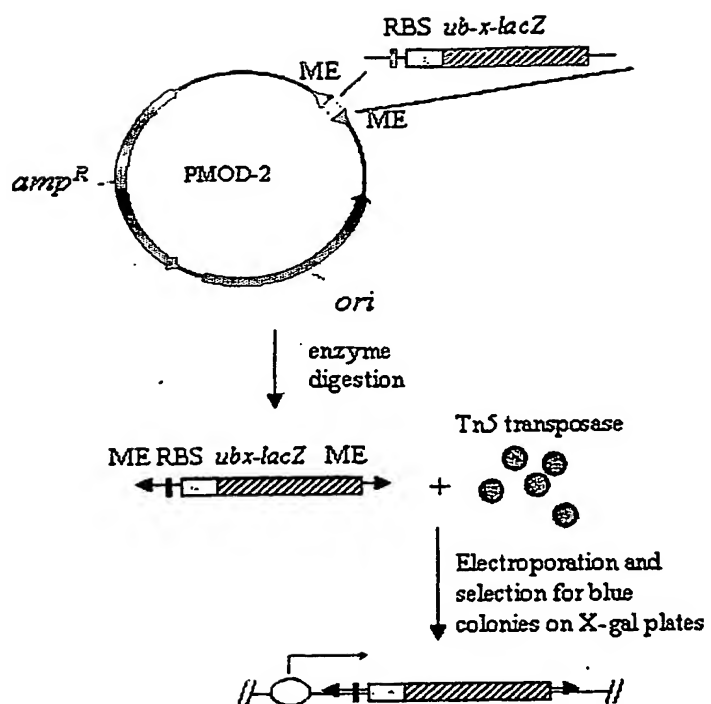
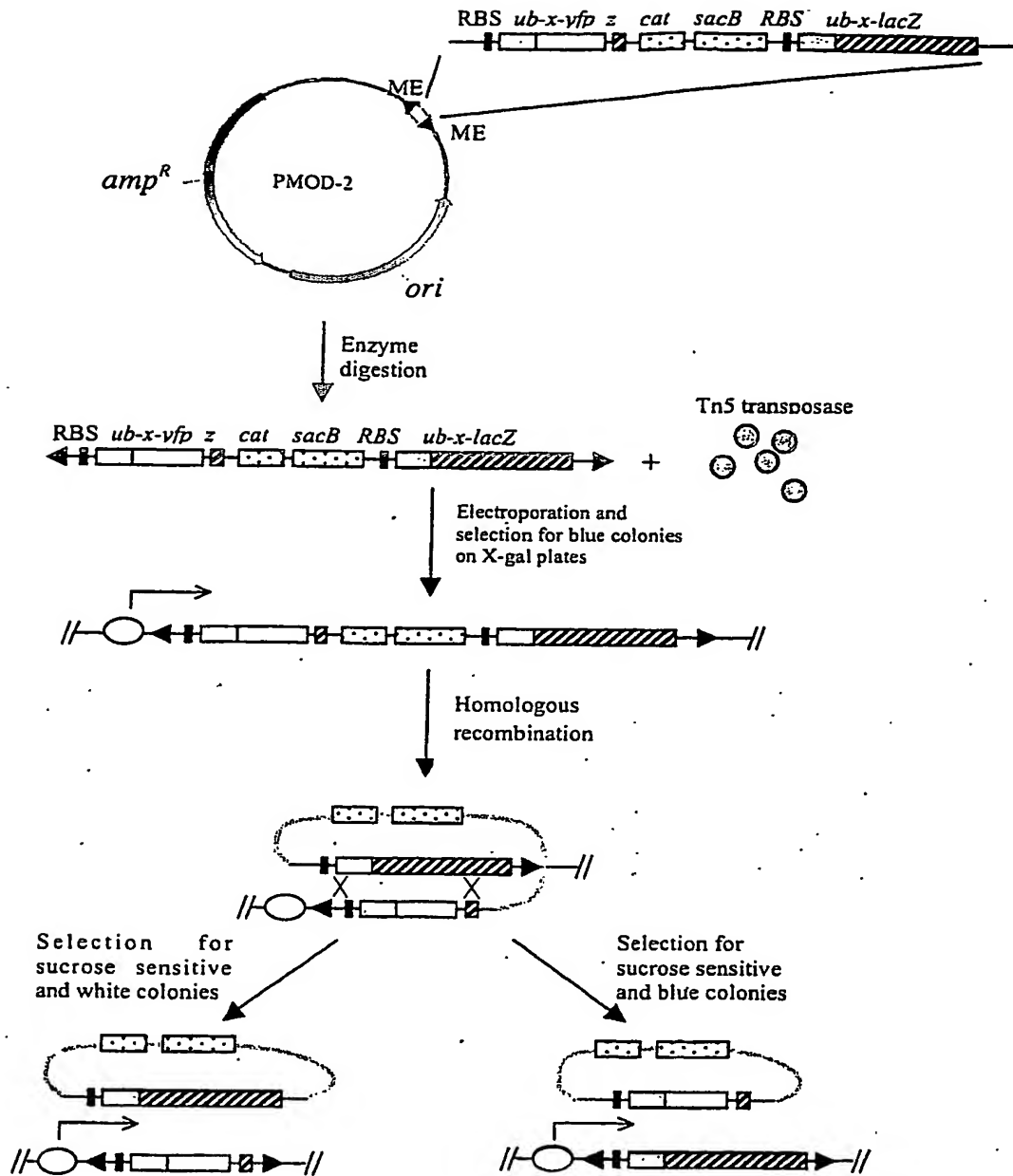


FIG. 10



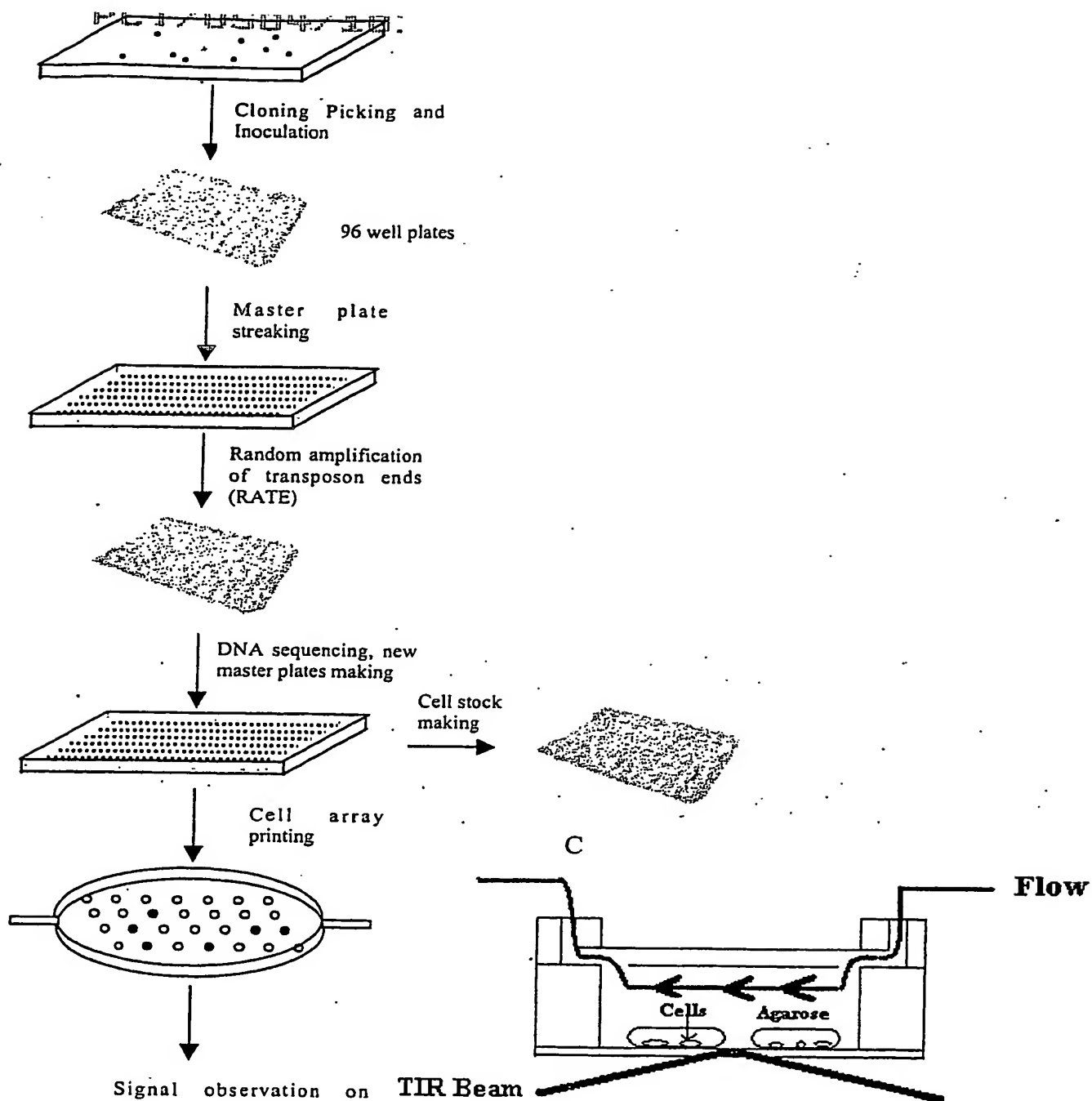
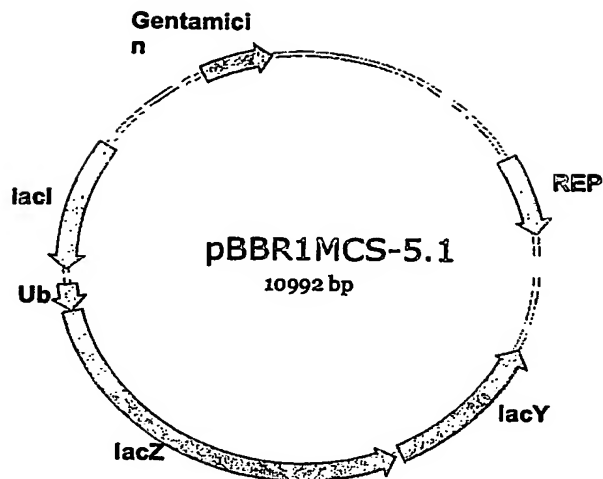


FIG. 12

(a)



(b)

Met Gln Ile Phe Val Lys Thr Leu Thr Gly Lys Thr Ile Thr Leu Glu Val Glu Ser Ser Asp Thr Ile Asp																			
GCGGATAACA	ATTTCACACA	GGAACAGCT	ATCCAGATT	TCGTCAAGAC	TTTGACCGGT	AAAACCATAA	CATTGGAAGT	TGAATCTTCC	GATACCATCG										
CGCGTATTGT	TAAAGTGTGT	CCTTTGTGGA	TACGTCTAAA	AGCAGTTCTG	AAACTGGCCA	TTTTGGTATT	GTAACCTTCA	ACTTAGAAGG	CTATGGTAGC										
Asp Asn Val Lys Ser Lys Ile Gln Asp Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly Arg Thr Leu Ser																			
ACAACGTTAA	GTCGAAAATT	CAAGACAAGG	AAGGTATCCC	TCCAGATCAA	CAAGATTGA	TCTTTGCCGG	TAAGCAGCTA	GAAGACGGTA	GAACGCTGTC										
TGTTGCAATT	CAGCTTTTAA	GTTCTGTTCC	TTCCATAGGG	AGGTCTAGTT	GTTTCTAAGT	AGAACGGGCC	ATTCTGCGAT	CTTCTGCCAT	CTTGGCAGAG										
Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Gly Leu Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg																			
TGATTACAAC	ATTGAGAAGG	AGTCCACCTT	ACATCTTTGT	CTAAGGCTAA	GAGGTGGT	ATGCGATGAT	AGGATTCAC	TGGGCTCCT	TTTACACCT										
ACTAATGTTG	TAAATCTTCC	TCAGGTGGAA	TGTAGAACAC	GATTCCGATT	CTCCACCA	ATGCGTACAT	TGCTAAGT	ACCGGCGCA	ATTCGTGCG										
Arg Asp Tyr Glu Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro Pro Phe Ala Ser Tyr Arg Asn Ser Glu Glu Ala Arg Thr Asp Arg Pro																			
CTGACTGGG	AAACCGTGG	CTTACCGAA	CTTAAACCC	TGGACGACA	ACCGGTTTC	GGCAGCTGGC	CTAATACCA	AGAGCCCGG	ACCGATCGCC										
GGATGACCC	TTTGGGACC	GAATGGG	GAATAGGG	AGGTCGCT	AGGCGGAA	CGGTGACCG	GATTATGGC	CTGGGGCG	TGGTAGCGG										

716.13

(a)



Figure 1. Fluorescence image of *Shewanella oneideensis* cells containing *lacZ* plasmid taken with a through-lens total internal reflection (TIR) fluorescence microscope. Each bright spot is a single cell, in which DDAO generated by the basal level expression of β -gal is detected with high sensitivity.

(b)

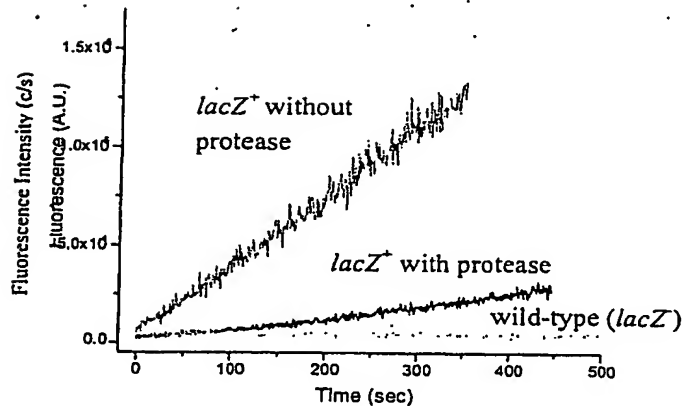
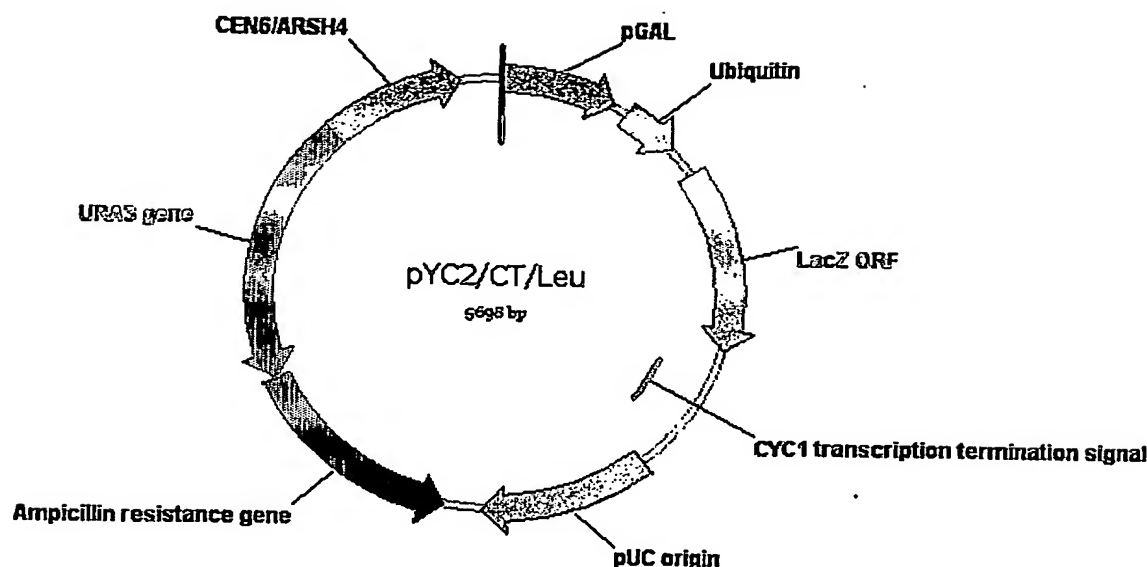


Figure 2. DDAO fluorescence generated by hydrolysis of DDAO-Gal with the wild-type *Shewanella oneideensis* cells (light gray lines), with cells containing *lacZ* plasmid (gray lines), and cells containing both *lacZ* and the ubiquitin-specific protease plasmid (black lines).

FIG 14

FIG. 1 (a)



(b)

1	ACGGATTAGA AGCCGCCGAG CGGGTGACAG CCTCCGAAG GAAGACTCTC CTCGGTGGCT CCTCGTCTTC ACCGGTCCGG	
81	TGCCIAATCT TCGGCGGCTC GCCCACTGTC GGGAGGCTTC CTCTGAGAG GAGGCACGCA GGAGCAGAAG TGGCCAGCGC	
161	AAGGACTTTG CGTCTACACG GAGCGCGGCG TGACGAGGCT TGTATTCT AAGATGTTAT GATCGAAAAT ACCAATACTT	
241	TAGTTTTT AGCCTTATTT CTGGGGTAAT TAATCAGCGA AGCGATGATT TTTGATCTAT TAACAGATAT ATAAATGCAA	
321	AAACTGCATA ACCACTTTAA CTAATACTTT CAACATTTTC GGTTTGATT ACTTCTTATT CAAATGTAAT AAAAGTATCA	
401	ACAAAAAATT GTTAATATAC CTCTATACTT TAACGTCAAG GAGAAAAAAC CCCGGATCGG ACTACTAGCA GCTGTAATAC	
481	GACTCACTAT AGGGAATATT AAGCTTGGTA CCATGCAGAT TTTCGTCAAG ACTTGACCG GTAAACCAT AACATTGGAA	
561	GTGAAATCTT CCGATACCAT CGACAACGTT AAGTCGAAAA TTCAAGACAA GGAAGGTATC CCTCCAGATC AACAAAGATT	
641	GATCTTTGCC GGTAAAGCAGC TAGAAGACGG TAGAACGCTG TCTGATTACA ACATTCAGAA GGAGTCCACC TTACATCTTG	
721	TGCTAAGGCT AAGAGGTGGT TTGCACGGAT CCGGAGCTTG GCTGTTGCC GTCTCACTGG TGAAAAGAAA AACCACCCTG	
801	CGCGCCAATA CGCAAACCGC CTCTCCCCGC GCGTTGGCGG ATTCATTAAT GCAGCTGGCA CGACAGGTTT CCCGACTTAA	
881	TCGCTTGGCA GCACATCCCC CTTTCGCCAG CTGGCGTAAT AGCGAAGAGG CCCGCACCGA TCGCCCTTCC CAACAGTTGC	
961	GCAGCCTGAA TGGCGAATGG CGCTTGCCT GGTTCGCGC ACCAGAAGCG GTGCCGAAA GCTGGCTGGA GTGCGATCTT	
1041	CCTGAGG	
	GGACTCC	

FIG. 15

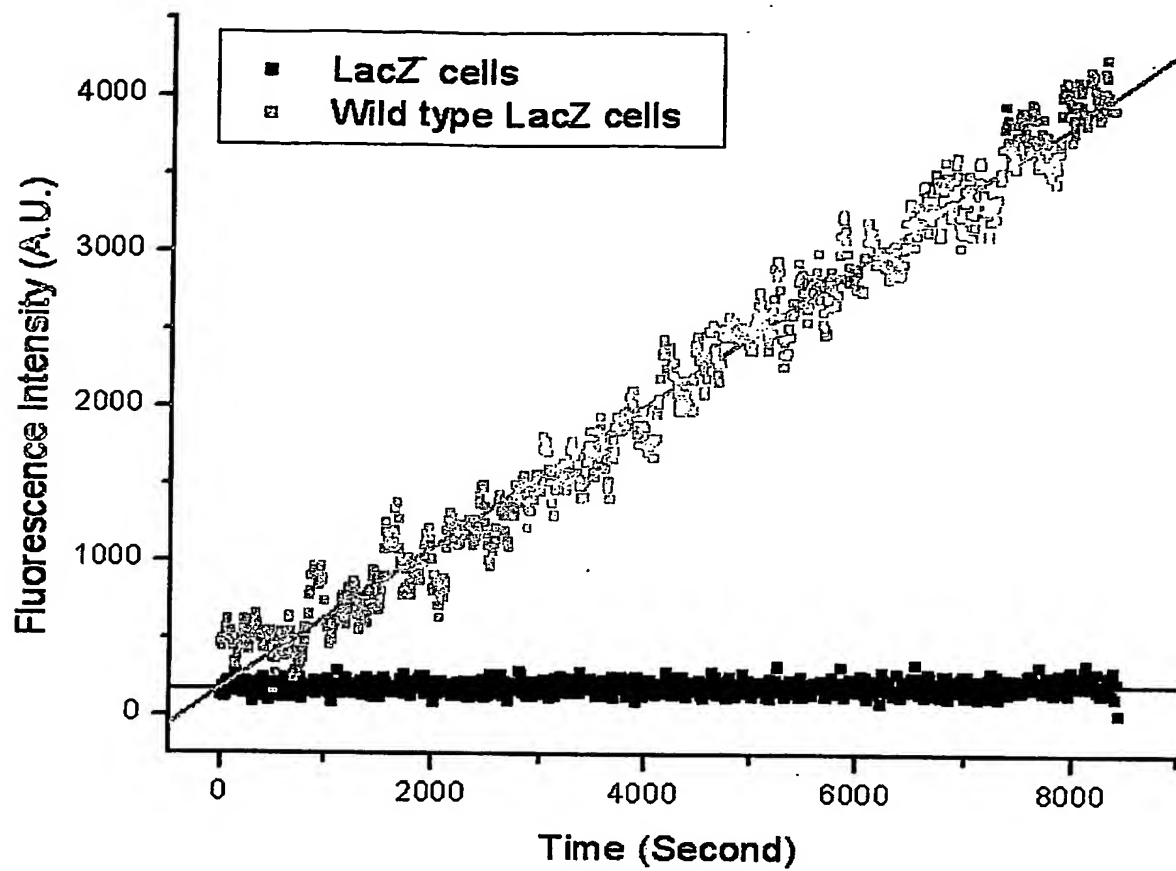


FIG. 16

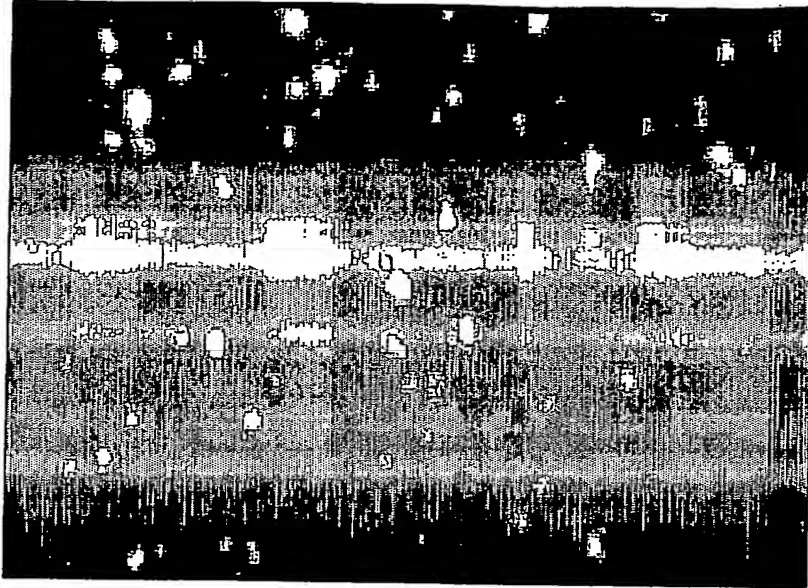


FIG. 17

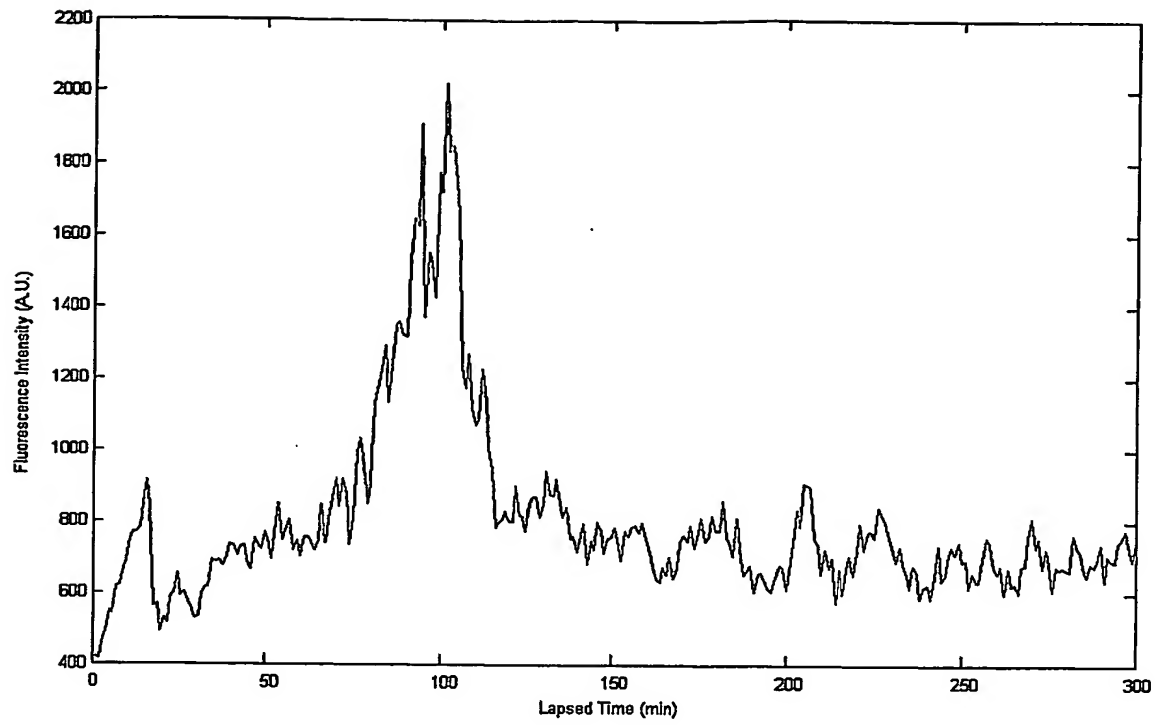


FIG. 18